Permeable Pavement – Public ROW

This checklist is intended to highlight items critical to the performance of permeable pavement facilities and surfaces that need to be addressed in the design plans and verified by a City of Seattle (COS) Seattle Public Utilities (SPU) plan reviewer or a designated representative.

Some items have detailed requirements that may not be explicitly stated; refer to the Stormwater Flow Control and Water Quality Treatment Technical Requirements Manual (Manual) and the Right-of-Way Improvements Manual (ROWIM) for specifics.

Technology Description
Porous or permeable pavements allow for infiltration of stormwater while providing a stable surface suitable for pedestrian and traffic loads. These pavements contain sufficient void space to infiltrate runoff into the underlying reservoir base course and soil. Pavements include brick, concrete grids, unit pavers, porous asphalt or concrete, and plastic confinement systems with grass or gravel filler. See Figures 4.12, 4.13, and 4.14 of the Manual. Permeable pavement facilities may be designed to take run-on from adjacent impervious areas. Permeable pavement surfaces are designed to only manage the water which falls upon it directly.

Site Assessment (Manual Volume 3, Section 4.3.4)

	Review Item
	Permeable Pavement Facilities only
❑	1. Facility is not within landslide-prone areas as defined by the Regulations for Environmental Critical Areas (SMC 25.09) and shown on the Critical Areas theme of GIS.
❑	2. Facility in the ROW is limited to the sidewalk and planting strip area only for projects located on arterial streets and/or in areas of dense underground infrastructure and only receives sidewalk runoff, unless otherwise approved by SPU.
❑	3. Infiltration is not permitted within any of these specified setbacks:
	▪ From the top of steep sloped areas, as defined by the Regulations for Environmental Critical Areas (SMC 25.09) and shown on the Critical Areas theme of GIS, calculated as 10 times the slope rise (to a 500 foot maximum) unless demonstrated as feasible by geotechnical analysis
	▪ When runoff from < 5,000 square feet of new/replaced impervious area is infiltrated on site, the facility cannot be within 5 feet from structure without basement, 10 feet from structure with basement
	▪ When runoff from ≥ 5,000 square feet of new/replaced impervious area is infiltrated on site, facility shall not be located adjacent to a structure with a basement without consideration for prevention of seepage into the basement. The resulting setback is no less than 5 feet from structure without basement, 10 feet from structure with basement.
	▪ 100 feet of confirmed and suspected contaminated sites as shown on the Environmental Hazardous Sites GIS theme
	▪ Infiltration within Y feet of confirmed and suspected contaminated sites as shown on the Environmental Hazardous Sites GIS theme requires analysis

	and approval by a professional engineer or geologist.
	▪ 10 feet of underground storage tank(s) or within Y feet of leaky underground storage tank(s) as shown on the Environmental Hazardous Sites GIS theme
	▪ 100 feet of proposed or existing septic systems or drain fields
❑	4. Minimum vertical separation requirements from the bottom of the facility (lowest elevation of the facility) to the underlying water table, bedrock, other impermeable layer or utility are met based on the following:
	▪ A minimum of 3 feet if the area tributary to the facility meets or exceeds any of the following limitations: 5,000 square feet of pollution-generating impervious surface; 10,000 square feet of impervious surface; ¾ acres of lawn and landscaped areas
	▪ A minimum of 1 foot if the above criteria are not exceeded for the area tributary to the facility
	▪ Any utility crossings through the bioretention soil area or a side sewer within 18 inches from the bottom of the bioretention soil and that are in the bedding material are identified on the drawings and specify a clay trench dam be constructed within the utility trench.
❑	5. Subsurface Characterization (information documented in the Technical Information Report (TIR) and/or geotechnical report)
	▪ For sites with < 5,000 square feet of impervious area to be infiltrated and that have not performed the modified PIT test, the design infiltration rate is assumed to be 0.25 inches per hour
	▪ Design infiltration rate was determined by performing the modified PIT method (described in section 4.3.3 and Appendix E) with correction factors applied
	▪ Test holes or pit explorations were performed during mid to late in the wet season (mid January through April) to provide accurate groundwater elevation information. At least one test pit or hole per 5,000 square feet of contributing area.
	▪ For sites where ≥ 10,000 square feet of impervious area will be infiltrated on site, the infiltration receptor is characterized and groundwater level monitoring has been performed as described in section 4.3.4.6

Design Requirements (Manual Volume 3, Section 4.4.2)

	Review Item
❑	1. Catchment area
	▪ **Facility** - Catchment area tributary to facility shall be no larger than 3 times the permeable pavement facility area, unless otherwise approved
	▪ **Surface** – Surfaces cannot receive run-on from other surfaces except sidewalks can collect stormwater from other non-PGIS sidewalk at 3 times the permeable pavement area.
❑	2. Flow Entrance/Presettling (**Facilities only**)
	▪ Plan sheet shows flow diversion and erosion control measures that will be installed until the upstream catchment area is thoroughly stabilized to protect

	the permeable pavement area from sedimentation
	▪ A presettling technique (e.g. variation on filter strip, presettling catch basin or vault) proceeds the permeable pavement when the catchment area exceeds 2,000 square feet and flow is concentrated
	▪ If the catchment area for a flow entrance exceeds 1,000 sf and flow is concentrated, plans sheet shows how run-on shall be dispersed to permeable pavement. If subsurface delivery is used, primary settling is required followed by distribution to storage reservoir.
❑	3. Pervious Wearing Course
	▪ Materials on the permeable pavement approved technology list (http://www.seattle.gov/util/naturalsystems)
	▪ There is positive surface drainage, minimum surface slope of 1 percent relative to??? -0 Is this the cross or longitudinal slope?
	▪ For a vegetated open-celled paving grid, specifications indicate that the topsoil has a minimum 4 percent organic matter by dry weight.
	▪ For pervious concrete pavements, plans specify use of City of Seattle specification (http://www.seattle.gov/util/naturalsystems)
❑	4. Leveling Course, if required
	▪ For proprietary products, a leveling course shall be indicated on the plans as indicated per manufacturer recommendations.
❑	5. Storage Reservoir Aggregate/Subbase
	▪ A minimum 6-inch depth of storage reservoir aggregate/base is shown on plans.
	▪ For permeable pavement in the ROW (such as driveways), a licensed engineer determined the minimum aggregate base thickness and analyzed subsoil load bearing for the traffic loading.
	▪ For permeable pavers, and grid systemsspecified storage reservoir aggregate/subbase is per manufacturer recommendations. At minimum, aggregate specified as clean, washed, crushed or angular material with less than 0.8% of material passing the #200 sieve (by weight).
	▪ **Facility** - If longitudinal slope > 2%, elements such as check dams or infiltration trenches are included as part of design to create subsurface ponding. If longitudinal slope < 2%, at least one low permeability check dam is shown on plans at the downslope end to contain water in the facility.
	▪ Design prevents the upper 6 inches of the pavement sections from becoming saturated.
❑	6. Overflow (**Facilities only**)
	▪ Required unless designed to provide full infiltration or designed as a surface only
	▪ Flows are conveyed to an approved discharge point
	▪ Slotted, thick-walled plastic pipe is used. Unless alternative approved, the pipe material shall be:
	❑ PVC per ASTM D1785, SCH 40 with solvent welded joints
	❑ Slots are to be 0.064 inch wide, on 45º centers, by 1.0 inch long and spaced 0.125 inch apart.
	▪ Minimum diameter of 4 inches

	▪ Clean out included on plans
	▪ If overflow located at maximum ponding depth, the pipe or daylight invert is shown on plans as located a minimum of 6 inches below the surface of the pavement.
	▪ If pipe located in area subject to traffic or other loading, appropriate cover depth and pipe material shown on plans
❑	7. Underdrain with flow restrictor (optional)
	▪ Located at bottom of storage reservoir
	▪ Flows are conveyed to an approved discharge point
	▪ Slotted, thick-walled plastic pipe is used. Unless alternative approved, the pipe material shall be:
	▫ PVC per ASTM D1785, SCH 40 with solvent welded joints
	▫ Slots are to be 0.064 inch wide, on 45º centers, by 1.0 inch long and spaced 0.125 inch apart.
	▪ Minimum diameter of 4 inches
	▪ Clean out for underdrain included
	▪ Minimum orifice diameter is 0.25 inches
❑	8. Non-Woven Geotextile (if required)
	▪ Plans specify non-woven geotextile between storage reservoir/aggregate subbase and prepared subgrade (or water quality treatment layer)
	▪ Plans specify non-woven geotextile wrap up and over the storage reservoir/aggregate subbase and be secured
❑	9. Water Quality Treatment Layer (optional)
	▪ If designed for water quality treatment, geotechnical report submitted verifying that native underlying soils meet the treatment soil requirements:
	▪ A sand filter may also be added for water quality.
❑	10. ROWIM Requirements (ROWIM Ch. 6.4)
	▪ Permeable pavements are located only on non-street surfaces, such as sidewalks at this time.
	▪ Permeable cement concrete approved in street ROW (sidewalk at this time). Required to follow COS specification (http://www.seattle.gov/util/naturalsystems) unless otherwise approved by a professional engineer.
	▪ Standard details from ROWIM used
❑	11. Sizing for flow control
	▪ The Pre-sized approach shown in Table 4.7 or Sidewalk Project DR, as appropriate, was used and all of the following criteria were met:
	▫ Project has < 10,000 square feet of new and replaced impervious area
	▫ Permeable pavement area was sized using the applicable sizing factor in Table 4.5, 4.13, or 4.15 or 5.17 for water quality treatment only
	▫ **Facility** – plans show maximum subsurface water ponding depth in storage reservoir before berm overtopping or overflow is at least 6 inches
	▫ No underdrain or impermeable liner included in design
	▪ Continuous model was used and all of the following criteria were met:
	▫ Assumptions listed in Table 4.14, Table 4.16, or Table 4.17, as

	appropriate, were used
❑	12. Maintenance
	▪ Contact information provided for party responsible for maintenance.